Application No. 09/785,559
Filed: February 16, 2001
Group Art Unit: 1744

AMENDMENT TO THE CLAIMS

1. (Currently amended) An apparatus for conducting electrophysiological measurements on cells comprising a measuring (31) head provided with at least one measuring electrode for impaling said cells, with at least one perfusion (76) conduit made as a perfusion inlet having a first end opening, wherein said at least one measuring electrodes ~~are~~ is integrated into a ~~common~~ support, said at least one perfusion inlet being arranged essentially parallel with said at least one measuring electrode, and said first end opening being located above a lower end of said at least one measuring electrode.

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2. (Currently amended) The apparatus of claim 1 wherein said at least one electrodes ~~are~~ is inserted into a recesses within said support.

3. (Currently amended) The apparatus of claim 1 wherein said at least one electrodes ~~are~~ is molded into said support.

4. (Currently amended) The apparatus of claim 1 wherein said at least one electrodes consists of pulled glass tubes.

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5. (Currently amended) The apparatus of claim 1 wherein said at least one electrode~~s have~~ has an electrical resistance of between 5 MΩ and 100 MΩ.

6. (Previously amended) The apparatus of claim 1 wherein said electrodes have an electrical resistance of between 500 kΩ and 5 MΩ.

7. (Currently amended) The apparatus of claim 1 wherein said at least one electrode~~s are~~ is configured as a wire electrodes~~.~~

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8. (Currently amended) The apparatus of claim 7 wherein said at least one electrode~~s are~~ is configured as a silver wire electrodes~~.~~

9. (Currently amended) The apparatus of claim 8 wherein said at least one electrode~~s are~~ is configured as a silver wire electrodes provided with a chloride coating.

10. (Currently amended) The apparatus of claim 1 wherein said at least one electrode has a straight section.

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11. (Currently amended) The apparatus of claim 1 wherein said at least one electrode is provided with a tip at its front terminal end.

12. (Currently amended) The apparatus of claim 1 wherein two electrodes are arranged essentially symmetrical relative to a longitudinal axis of said ~~carrier~~ support.

13. (Previously amended) The apparatus of claim 12 wherein said electrodes have a distance d at their free terminal end being between 50 μm and 800 μm.

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14. (Currently amended) The apparatus of claim 12 wherein said at least one electrode has a straight section, said straight section enclosing an acute angle α with a longitudinal axis of said support.

15. (Previously amended) The apparatus of claim 14 wherein said acute angle α is between 3° and 10°.

16. (Cancelled)

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17. (Currently amended) The apparatus of claim ~~16~~ 1 wherein said at least one measuring electrode is coupled to a measuring amplifier.

18. (Previously amended) The apparatus of claim 17 wherein said measuring amplifier is adapted to be adjusted.

19. (Previously amended) The apparatus of claim 1 wherein said at least one measuring electrode is connected to a current source.

20. (Previously amended) The apparatus of claim 19 wherein said current source is adapted to be adjusted.

21. (Previously amended) The apparatus of claim 1 wherein said at least one electrode is configured as a reference electrode.

22. (Previously amended) The apparatus of claim 21 wherein said reference electrode is connected to ground.

23. (Currently amended) The apparatus of claim ~~2~~ 22 wherein two measuring electrodes and two reference electrodes are provided.

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24. (Currently amended) The apparatus of claim ~~16~~ 1 wherein ~~said~~ at least two measuring electrodes are arranged in a first common plane.

25. (Currently amended) The apparatus of claim ~~21~~ 23 wherein at least two reference electrodes are arranged in a second common plane.

26. (Currently amended) The apparatus of claim 24 wherein said first and ~~said~~ a second plane extend parallel to each other and wherein at least two reference electrodes are arranged in ~~a~~ said second common plane.

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27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Currently amended) The apparatus of claim ~~14~~ 1 wherein said perfusion inlet is arranged essentially on a symmetry axis between ~~said~~ two measuring electrodes ~~and wherein said perfusion inlet has a first end opening~~, said perfusion inlet being arranged

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essentially parallel with said ~~at least one~~ two measuring electrodes, said first end opening being located above a lower end of said ~~at least one~~ two measuring electrodes.

31. (Currently amended) The apparatus of claim ~~27~~ 1 wherein said perfusion inlet is connected to a conveyor pump.

32. (Previously amended) The apparatus of claim 31 wherein said pump is adapted to be adjusted.

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33. (Currently amended) The apparatus of claim ~~27~~ 1 wherein said perfusion inlet is adapted to be connected to a plurality of storage containers via a controllable valve system.

34. (Previously amended) The apparatus of claim 33 wherein said storage containers are arranged above said perfusion inlet.

35. (Currently amended) The apparatus of claim 33 wherein said ~~at least one~~ storage containers contains a test liquid.

36. (Currently amended) The apparatus of claim 33 wherein said ~~at least one~~ storage containers contains a rinsing liquid.

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37. (Currently amended) The apparatus of claim ~~27~~ 1 wherein ~~said~~ at least one perfusion conduit is a perfusion outlet.

38. (Currently amended) The apparatus of claim ~~29~~37 wherein said perfusion outlet has a second end opening, said second end opening being located above the first end opening ~~and wherein said perfusion conduit is a perfusion outlet~~.

39. (Previously amended) The apparatus of claim 38 wherein said end openings are oriented along opposite directions.

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40. (Previously amended) The apparatus of claim 37 wherein said perfusion outlet is connected to a suction pump.

41. (Previously amended) The apparatus of claim 40 wherein said suction pump is adapted to be adjusted.

42. (Currently amended) The apparatus of claim 26 wherein, as viewed on first plane, said perfusion inlet is located in front of said first plane and ~~said~~ a perfusion outlet is located behind said second plane ~~and wherein said perfusion inlet has a first end opening, said perfusion inlet being arranged essentially parallel with said at least one measuring electrode, said first end opening~~

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~~being located above a lower end of said at least one measuring electrode~~ and wherein ~~said~~ at least one perfusion conduit is ~~a~~ said perfusion outlet.

43. (Currently amended) The apparatus of claim 1 further comprising a receptacle for said cells wherein said ~~at least one~~ measuring head is arranged on an actuator, said actuator being adapted to be displaced along a coordinate system above ~~a~~ said receptacle ~~for said cells~~.

44. (Previously amended) The apparatus of claim 43 wherein said actuator carries a plurality of measuring heads.

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45. (Previously amended) The apparatus of claim 44 wherein said measuring heads are adapted to be displaced individually relative to said actuator along said axis z directed towards said cell.

46. (Previously amended) The apparatus of claim 43 wherein said measuring head is affixed to said actuator by plugging or screwing.

47. (Previously amended) The apparatus of claim 1 wherein means are provided for injecting cDNA and/or mRNA into said cell.

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48. (Currently amended) The apparatus of claim 47 wherein said means are located on ~~said~~ an actuator.

49. (Previously amended) The apparatus of claim 43 wherein said receptacle for said cell is configured as a standardized multi-well-plate.

50. (Currently amended) The apparatus of claim 49 wherein ~~said~~ individual ~~receptacles~~ wells within said plate are provided with a readable code, said actuator comprising means for reading said code.

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51. (Previously amended) The apparatus of claim 50 wherein said code is a bar code, said means being a bar code reading head.

52. (Previously added) The apparatus of claim 13 wherein said distance d is between 200 μm and 500 μm.

53. (Previously added) The apparatus of claim 15 wherein said acute angle α is 5°.

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54. (New) An apparatus for conducting electrophysiological measurements on cells comprising a measuring head provided with at least two electrodes for impaling said cells of which at least one electrode is configured as a measuring electrode, and at least one perfusion conduit made as a perfusion inlet, wherein said electrodes and said at least one perfusion conduit are integrated into a common support, said electrodes are arranged essentially symmetrical relative to a longitudinal axis of said support, and wherein at least one electrode has a straight section enclosing an acute angle α with said longitudinal axis of said support, and wherein said perfusion inlet is arranged essentially on a symmetry axis between said electrodes, and wherein said perfusion inlet has a first end opening, said perfusion inlet being arranged essentially parallel with said electrodes, and said first end opening being located above a lower end of said at least one measuring electrode.

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55. (New) An apparatus for conducting electrophysiological measurements on cells comprising a measuring head provided with at least one electrode for impaling said cells, of which at least one electrode is configured as a measuring electrode, with one first perfusion conduit made as a perfusion inlet, with a second perfusion conduit made as a perfusion outlet, wherein said at

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least one electrode and said perfusion conduits are integrated into a common support, said perfusion inlet has a first end opening and is arranged essentially parallel with said at least one measuring electrode, said first end opening being located above a lower end of said at least one measuring electrode, and said perfusion outlet has a second end opening being located above the first end opening.

56. (New) An apparatus for conducting electrophysiological measurements on cells comprising a measuring head provided with at least two measuring electrodes for impaling said cells, at least two reference electrodes, a first perfusion conduit made as a perfusion inlet having a first end opening, a second perfusion conduit made as a perfusion outlet, said at least two measuring electrodes are integrated into a common support, said at least two measuring electrodes are arranged in a first common plane and said at least two reference electrodes are arranged in a second common plane, said first and said second plane extend parallel to each other, and as viewed on said first plane, said perfusion inlet is located in front of said first plane and said perfusion outlet is located behind said second plane, said perfusion inlet being arranged essentially parallel with said at least two measuring

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electrodes, said first end opening being located above a lower end of said at least two measuring electrodes.

57. (New) An apparatus for conducting electrophysiological measurements on cells comprising a plurality of measuring heads arranged on an actuator, said measuring heads are provided with at least one electrode for impaling said cells, said at least one electrode is integrated into a support, wherein said measuring heads are adapted to be displaced individually relative to said actuator along said axis z directed towards said cells.

58. (New) An apparatus for conducting electrophysiological measurements on cells with at least one electrode for impaling said cells, a first perfusion conduit made as a perfusion inlet having a first end opening for supplying perfusate to the cells, said perfusion inlet being arranged essentially parallel with said at least one electrode, said first end opening being located above a lower end of said at least one electrode, a second perfusion conduit made as a perfusion outlet having a second end opening for purging perfusate away from the cells, said second end opening being located above the first end opening, wherein said at least one electrode is integrated together with said perfusion conduits into a common support of a measuring head.

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